

REMARKS

I. Status of the Application

Claims 1-27 are pending in this application. In the August 3, 2001 office action, the Examiner:

1. Required restriction to one of four specifically illustrated alternative embodiments of the present invention;
2. Rejected claims 1-3, 11, 13, 18 and 20 under 35 U.S.C. § 102(b) as allegedly being anticipated by WIPO Publication No. WO 98/28961 to Magnet-Motor Gesellschaft fur Magnetomotorische Technik MBH (hereinafter "WIPO");
3. Rejected claims 4-5, 14-16, and 21-22 under 35 U.S.C. § 103(a) as allegedly being unpatentably obvious over WIPO in view of U.S. Patent No. 4,684,328 to Murphy (hereinafter "Murphy");
4. Rejected claims 4, 7, 14, 17, 21, and 24 under 35 U.S.C. § 103(a) as allegedly being unpatentably obvious over WIPO in view of U.S. Patent No. 4,498,851 to Kolm et al. (hereinafter "Kolm");
5. Rejected claims 10 and 27 under 35 U.S.C. § 103(a) as allegedly being unpatentably obvious over WIPO in view of a reference to one Frankeny (hereinafter "Frankeny"); and
6. Rejected claim 12 under 35 U.S.C. § 103(a) as allegedly being unpatentably obvious over WIPO in view of U.S. Patent No. 4,302,793 to Rohner (hereinafter "Rohner"); and

7. Rejected claim 19 under 35 U.S.C. § 103(a) as allegedly being unpatentably obvious over WIPO in view of U.S. Patent No. 6,052,284 to Suga et al. (hereinafter "Suga").

In this response, applicants have amended claim 1. Applicants otherwise traverse the prior art rejections and request favorable reconsideration of the claims in view of the foregoing amendments and the following remarks.

II. Election With Traverse

Applicants traverse the election requirement. Plural generic claims, including claim 11, are allowable.

Applicants nevertheless elect species I, shown in Fig. 6, among others. At least claims 1-6, 10-16, 18-23 read on the species shown in Fig. 6.

III. The Prior Art Rejection of Claim 1 Should be Withdrawn

In the August 3, 2001 office action, the Examiner rejected claim 1 as being anticipated by WIPO. For reasons that will be discussed below in further detail, it is respectfully submitted that WIPO does not teach, disclose or suggest all of the limitations of claim 1. As a result, the rejection of claim 1 should be withdrawn.

A. The Present Invention

Claim 1, as amended, is directed to an arrangement for cooling an electronic assembly that has a circuit board with at least one aperture therein. The arrangement includes an enclosure member secured to the circuit board to form a fluid tight compartment. At least one electromechanical actuator is disposed within the fluid tight compartment. As amended, the electromechanical actuator is disposed, in part, *over the aperture* of the circuit board.

The phrase “disposed over the . . . aperture”, as normally used and as used herein, means, “axially aligned with” or “axially outward”, where “axial” means any line that passes through the aperture perpendicular to the surface on which the aperture lies. In other words, “disposed over the . . . aperture” means aligned with, but not located within, the aperture. Support for this amendment is found throughout the specification *as originally filed*. For example, Figs. 6, 7A, 7B and 8A show embodiments of the arrangement that include actuators disposed, at least in part, *over* the aperture.

B. WIPO

WIPO does not show an actuator that is disposed over the aperture, as called for in claim 1 as amended. Moreover, nothing in WIPO suggests modifying the device disclosed therein to include an actuator so disposed. Accordingly, it is respectfully submitted that the anticipation rejection of claim 1 should be withdrawn.

In particular, the “electromechanical actuator” of WIPO, the fan 8, is not disposed over the apertures 18. Instead, the fan 8 is disposed past the end of the circuit board 12,

and blows air around the end of the circuit board 12. Because the fan of WIPO is not disposed over the apertures 18, WIPO does not disclose the claimed invention.

IV. Claims 2-5 and 7

Claims 2 and 3 also stand rejected as anticipated by WIPO. Claims 2 and 3 both depend from and incorporate all of the limitations of claim 1. Accordingly, for at least the same reasons as those set forth above in connection with claim 1, it is respectfully submitted that the rejection of claims 2 and 3 over WIPO should be withdrawn.

Claim 4 depends from and incorporates all of the limitations of claim 1. Claim 4 stands rejected over WIPO in view of either Murphy or Kolm. Neither Murphy nor Kolm cures the deficiencies of WIPO with respect to claim 1. In particular, neither Murphy nor Kolm disclose an actuator disposed over an aperture of a circuit board, as called for in claim 1. As a result, it is respectfully submitted that the rejection of claim 4 over WIPO in view of either Murphy or Kolm should be withdrawn.

Claim 5 depends from and incorporates all of the limitations of claim 1. Claim 5 stands rejected over WIPO in view of Murphy. As discussed above in connection with claim 4, Murphy does not cure the deficiencies of WIPO with respect to claim 1. As a result, it is respectfully submitted that the rejection of claim 5 over WIPO in view of Murphy should be withdrawn.

Claim 7 depends from and incorporates all of the limitations of claim 1. Claim 7 stands rejected over WIPO in view of Kolm. As discussed above in connection with claim 4, Kolm does not disclose an actuator disposed over an aperture of a circuit board,

as called for in claim 1. As a result, it is respectfully submitted that the rejection of claim 7 over WIPO in view of Kolm should be withdrawn.

V. The Rejection of Claim 11 Should Be Withdrawn

Claim 11 stands rejected as being anticipated by WIPO. As will be discussed below in further detail, WIPO fails to disclose each and every element of claim 11.

Claim 11 is directed to a *method* for cooling at least one circuit element disposed on a first surface of a circuit board. The method includes, among other things, a step of “dissipating a quantity of heat generated by the at least one circuit element to a first portion of liquid disposed in the first subcompartment”. WIPO does not teach, disclose or suggest any step that includes dissipating heat “to a first portion of liquid”.

The Examiner does not appear to disagree that WIPO fails to teach dissipating heat to a liquid. Instead, the Examiner appears to allege that dissipating heat to a liquid is not a positive limitation of claim 11. In particular, the Examiner provided the following reasoning for the rejection of claim 11:

Regarding claims 11 and 18, it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. Ex parte Masham, 2 USPQ2d 1647 (1987). Therefore, the specific working fluid, *i.e.* liquid or gas, is not a structural limitation.

(August 3, 2001 office action at pp.3-4).

Applicants respectfully disagree that Ex Parte Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Intf. 1987) has any applicability to claim 11. Claim 11 is directed to a method. The method includes a step of dissipating heat to a liquid. Dissipating heat to a liquid is not “a recitation with respect to the manner in which a claimed apparatus is intended to be

employed". In particular, there is no claimed apparatus.

Accordingly, it is respectfully submitted that the Examiner has failed to make out a prima facie case of anticipation with respect to claim 11. As a result, the anticipation rejection of claim 11 should be withdrawn.

VI. Claims 12-17

Claims 12-17 all depend from and incorporate all of the limitations of claim 11. Claims 12-17 stand rejected as being unpatentable over WIPO alone or in view of one of a plurality of prior art references. For the reasons discussed below, it is respectfully submitted that the rejections of those claims should be withdrawn.

Claim 12 stands rejected over WIPO in view of Rohner. The Examiner has cited Rohner as providing the teaching of a second aperture. (August 3, 2001 office action at p. 5). Rohner is not cited as providing any motivation or suggestion to modify the teachings of WIPO to include a step of dissipating heat to a liquid, as called for in claim 11. Accordingly, the combination of WIPO and Rohner as proposed by the Examiner does not arrive at the invention of claim 12. As a result, it is respectfully submitted that the rejection of claim 12 should be withdrawn.

Claim 13 stands rejected as anticipated by WIPO. Claim 13 depends from and incorporates all of the limitations of claim 11. Accordingly, for at least the same reasons as those set forth above in connection with claim 11, it is respectfully submitted that the rejection of claim 13 over WIPO should be withdrawn.

Claim 14 depends from and incorporates all of the limitations of claim 11. Claim

14 stands rejected over WIPO in view of either Murphy or Kolm. The Examiner has not alleged that either Murphy or Kolm provide any motivation or suggestion to modify the teachings of WIPO to include a step of dissipating heat to a liquid, as called for in claim 11. Accordingly, the combination of WIPO and Murphy as proposed the Examiner does not arrive at the invention of claim 14, and the combination of WIPO and Kolm as proposed by the Examiner does not arrive at the invention of claim 14. As a result, it is respectfully submitted that the rejection of claim 14 should be withdrawn.

Claims 15 and 16 stand rejected over WIPO in view of Murphy. Claims 15 and 16 both depend from and incorporate all of the limitations of claim 11. As a consequence, both claims incorporate a limitation that involves dissipating heat to a liquid, as set forth in claim 11. As discussed above in connection with claim 14, the combination of WIPO and Murphy as proposed by the Examiner does not arrive at a method that performs such a step. Accordingly, the combination of WIPO and Murphy as proposed by the Examiner does not arrive at the invention of either of claims 15 or 16. As a result, it is respectfully submitted that the rejections of claims 15 and 16 should be withdrawn.

Claim 17 stands rejected over WIPO in view of Kolm. Claim 17 depends from and incorporates all of the limitations of claim 11. Thus, claim 17 also incorporates a limitation that involves dissipating heat to a liquid, as set forth in claim 11. As discussed above in connection with claim 14, the combination of WIPO and Kolm as proposed by the Examiner does not arrive at a method that performs such a step. Accordingly, the combination of WIPO and Kolm as proposed by the Examiner does not arrive at the

invention of claim 17. As a result, it is respectfully submitted that the rejection of claim 17 should be withdrawn.

VII. Claim 18

Claim 18 stands rejected as being anticipated by WIPO. As will be discussed below in further detail, WIPO fails to disclose each and every element of claim 18.

Claim 18 is directed to an arrangement for cooling an electronic assembly that includes a circuit board, an enclosure member, a liquid, and at least one electromechanical actuator. The enclosure member is secured to the circuit board and forms a fluid tight barrier of a compartment in which the liquid is disposed. WIPO fails to teach or suggest a liquid disposed within a compartment as claimed.

The Examiner does not appear to allege that WIPO teaches a liquid disposed within the compartment as claimed. Instead, the Examiner appears to allege that the liquid disposed within the compartment is not a positive limitation of claim 18. In particular, as set forth above in connection with claim 11, the Examiner provided the following reasoning for the rejection of claim 18:

Regarding claims 11 and 18, it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. Ex parte Masham, 2 USPQ2d 1647 (1987). Therefore, the specific working fluid, *i.e.* liquid or gas, is not a structural limitation.

(August 3, 2001 office action at pp.3-4).

Applicants respectfully disagree that Ex Parte Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Intf. 1987) permits the Examiner to disregard the “liquid disposed within said compartment” element in the determination of patentability of claim 18. The “liquid

disposed within said compartment” limitation is no less a *structural* limitation than the claimed circuit board and enclosure member. The liquid within the compartment is not “a recitation with respect to the manner in which a claimed apparatus is intended to be employed”, as alleged by the Examiner.

Regardless of the manner in which the apparatus of claim 18 is “intended to be employed”, it includes a circuit board, an enclosure member, a liquid, and at least one electromechanical actuator. WIPO does not teach a device that includes the liquid as claimed. Accordingly, it is respectfully submitted that the Examiner has failed to make out a prima facie case of anticipation with respect to claim 18. As a result, the anticipation rejection of claim 18 should be withdrawn.

VIII. Claims 19-22 and 24

Claims 19-22 and 24 all depend from and incorporate all of the limitations of claim 18. Claims 19-22 and 24 stands rejected as being unpatentable over WIPO alone or in view of one of a plurality of prior art references. For the reasons discussed below, it is respectfully submitted that the rejections of those claims should be withdrawn.

Claim 19 stands rejected over WIPO in view of Suga. The Examiner has cited Suga as providing the teaching of an external portion of a circuit board. In particular, the Examiner stated:

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to employ in Wickelmaier [WIPO] et al an external circuit board portion for the purpose of attaching the circuit board to a main or mother board as recognized by Suga et al.

(August 3, 2001 office action at p. 6).

Thus, Suga is not cited as providing any motivation or suggestion to modify the teachings of WIPO to include a liquid disposed within a compartment as called for in claim 18. Accordingly, the combination of WIPO and Suga *as proposed by the Examiner* does not arrive at the present invention. As a result, it is respectfully submitted that the rejection of claim 19 should be withdrawn.

Claim 20 stands rejected as anticipated by WIPO. Claim 20 depends from and incorporates all of the limitations of claim 19. Accordingly, for at least the same reasons as those set forth above in connection with claim 19, it is respectfully submitted that the rejection of claim 20 over WIPO should be withdrawn.

Claim 21 depends from and incorporates all of the limitations of claim 18. Claim 21 stands rejected over WIPO in view of either Murphy or Kolm. The Examiner has not alleged that either Murphy or Kolm provide any motivation or suggestion to modify the teachings of WIPO to include a liquid disposed within a compartment, as called for in claim 18. Accordingly, the combination of WIPO and Murphy as proposed the Examiner does not arrive at the invention of claim 21, and the combination of WIPO and Kolm as proposed by the Examiner does not arrive at the invention of claim 21. As a result, it is respectfully submitted that the rejection of claim 21 should be withdrawn.

Claim 22 stands rejected over WIPO in view of Murphy. Claim 22 depends from and incorporates all of the limitations of claim 18. Thus, claim 22 also incorporates a limitation that is directed to a liquid disposed within a compartment, as set forth in claim 18. As discussed above in connection with claim 21, the combination of WIPO and Murphy as proposed by the Examiner does not arrive at an arrangement that includes a

liquid disposed within such a compartment. Accordingly, the combination of WIPO and Murphy as proposed by the Examiner does not arrive at the invention of claim 22. As a result, it is respectfully submitted that the rejection of claim 12 should be withdrawn.

Claim 24 stands rejected over WIPO in view of Kolm. Claim 24 depends from and incorporates all of the limitations of claim 18. As a consequence, claim 24 incorporates a limitation directed to a liquid disposed within a compartment, as set forth in claim 18. As discussed above in connection with claim 21, the combination of WIPO and Kolm as proposed by the Examiner does not arrive at an arrangement that includes a liquid disposed within such a compartment. Accordingly, the combination of WIPO and Kolm as proposed by the Examiner does not arrive at the invention of claim 24. As a result, it is respectfully submitted that the rejection of claim 24 should be withdrawn.

IX. Claims 10 and 27

Claims 10 and 27 stand rejected over WIPO in view of Frankeny. Applicants' attorney could not locate any citation of Frankeny, and respectfully requests further information regarding that reference if the rejections over WIPO in view of Frankeny are sustained.

In any event, claims 10 and 27 depend from and incorporate all of the limitations of claims 1 and 18, respectively. Frankeny is not cited for the purpose of overcoming the deficiencies of WIPO with respect to either of claims 1 and 18. Accordingly, it is respectfully submitted that the Examiner has not made out a prima facie case of obviousness with respect to claims 10 and 27. As a result, it is respectfully submitted that

the rejections of claims 10 and 27 should be withdrawn.

X. Conclusion

For all of the foregoing reasons, it is respectfully submitted that the application is in a condition for allowance. Favorable reconsideration and allowance of this application is, therefore, earnestly solicited.

Respectfully Submitted,



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Attachment Showing Marked Up Versions of the Amended Claims

1. (amended) An arrangement for cooling an electronic assembly, the arrangement comprising:

a circuit board having a first surface, a second surface, and at least a first heat-generating element secured to the first surface, the circuit board further comprising at least one aperture extending between the first surface and the second surface;

an enclosure member secured to said circuit board so as to form a fluid tight barrier of a compartment defined at least in part by said enclosure member, said compartment including a first subcompartment defined at least in part by said first surface and said enclosure member and a second subcompartment defined at least in part by said second surface and said enclosure member; and

at least one electromechanical actuator secured within the fluid type barrier, at least a portion of the at least one electromechanical actuator disposed over the at least one aperture, the electromechanical actuator operable to generate a flow movement in the direction of the at least one aperture when liquid is disposed in the fluid tight barrier.